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ALTERNATIVE CROPS FOR HAWAII: A BIBLIOGRAPHY OF METHODOLOGIES FOR SCREENING

John C. Roecklein, PingSun Leung, and John W. Malone, Jr.

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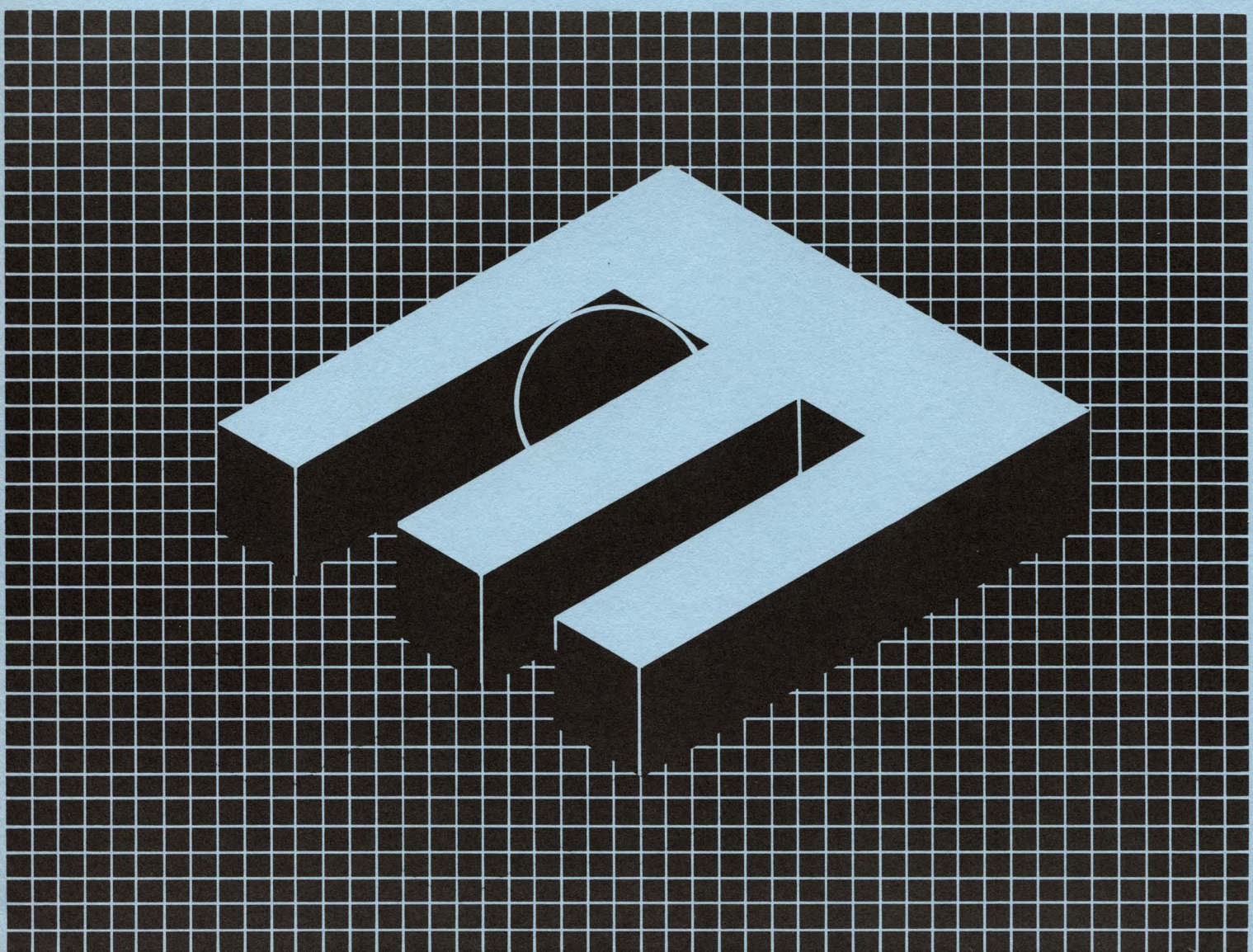

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THE AUTHORS

John C. Roecklein is a junior researcher, Department of Agricultural and Resource Economics, College of Tropical Agriculture and Human Resources, University of Hawaii.

PingSun Leung is an assistant professor in the same department.

John W. Malone, Jr., is a professor, Department of Agricultural Economics, Pennsylvania State University.

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ALTERNATIVE CROPS FOR HAWAII: A BIBLIOGRAPHY OF METHODOLOGIES FOR SCREENING

John C. Roecklein, PingSun Leung, and John W. Malone, Jr.

INTRODUCTION

The State of Hawaii, like many states across the nation, has an agricultural sector heavily dependent upon a few crops. Although the call for agricultural diversification has been heralded in many states, Hawaii's need for diversification may be somewhat greater than that of other states.

Over the past two decades, both of Hawaii's principal agricultural industries, sugarcane and pineapple, have been in decline with contracting acreage planted, employment, and returns. Reasons for this are varied. Even with relatively high yields for these crops, firms in Hawaii do not enjoy a comparative advantage over many producing regions in the world, as do, for example, the major feed and food grain–producing states on the mainland.

A decline in U.S. per capita consumption of refined sugar, brought on by the introduction of high fructose corn syrup (HFCS), has adversely affected the U.S. sugar industry. Per capita consumption of refined sugar fell from 101.7 pounds in 1970 to 71.0 pounds in 1983.[1] With respect to all caloric sweeteners, the HFCS market share moved from less than one percent in 1970 to 24.7 percent in 1983, while the refined sugar share declined from 83 percent to 57 percent over the same period. Increased demand for noncaloric sweeteners and health issues related to sugar consumption have also contributed to its declining use.

Price instability in the world sugar market, resulting from highly variable world production, sugar subsidization policies, and a large number of bilateral trade agreements, has been detrimental to Hawaii's sugar industry. With respect to pineapple, low prices received by producers and lower per-unit costs of production elsewhere are reasons given for the decline in Hawaiian production and acreage planted.

In Hawaii, the results of new crop development efforts can be seen in the growth of the papaya, macadamia nut, and nursery stock industries. Such industries are testimonies to the call for diversification, which goes back at least five decades.[2] Historically, in both Hawaii and the continental United States, diversification efforts have been characterized as costly and time consuming.[3]

PROJECT BACKGROUND

Recently, the United States Department of Agriculture funded a project with the goal of developing ways of expediting the process of screening and identifying promising crops for Hawaiian agriculture. With a shortened list of "promising" crops, traditional agricultural research methods can be used on those crops having better chances of devel-

[1]All statistics used in this paragraph are from USDA, ERS, June and September 1984, *Sugar and Sweetener Outlook and Situation Report*, Washington, D.C.

[2]F. G. Krauss, December 1933, "Balancing Hawaii's Agriculture," *Paradise of the Pacific.*

[3]Council for Agricultural Science and Technology (CAST), in this report, pp. 2, 18.

oping into full scale industries. The work is divided between two teams. The agricultural engineering contingent is focusing on the physical aspects of crop production with considerations including Hawaiian land characteristics, weather, and crop requirements. The authors are considering the socioeconomic aspects of new crop development. Two major objectives have been identified for this phase of the project: to develop a crop-economic database and to develop and test a crop screening methodology. Questions regarding necessary screening criteria, data availability, and economic and physical data interfaces must be resolved. Work by the socioeconomic team started with a literature search. This report identifies those citations found so far, which relate directly to either the screening methodology or the crop-economic database.

SCOPE OF BIBLIOGRAPHY

This report summarizes the important literature found over the past 12 months. It is limited in scope. Only those citations relating directly to the question of screening methodology or a crop-economic database are included. For example, no citations have been included for books or articles that concern "trade theory" or "establishment of trade" in general, although citations that specifically consider trade theory as it relates to new products are included.

The graduate and undergraduate libraries at the University of Hawaii were manually searched, and the National Agricultural Library was searched via computer. Words and phrases used in the search include project analysis, new crops, alternative crops, strategic planning, new product development, and industrial innovation. Additionally, people with interests in alternative crops, both in the United States and abroad, have been contacted for information regarding materials they find useful in their work.

ORDER OF BIBLIOGRAPHY

The bibliography consists of two parts: a master author list and a set of two indexes. The author list is alphabetized and includes information on the following: author(s), year of publication, title of the citation, publisher, any number of keywords describing the citation, geographic area of relevance, and an abstract.

The first index alphabetizes the names of all authors, either senior or junior. Next to each author's name is a number or numbers corresponding to the position in the master author list where information concerning the publication(s) may be found. The second index deals with keywords. Our view of "new crop development" is broad in nature. A series of keyword descriptors has been attached to each citation as a means of identifying particular subject areas found in each citation. This index is an alphabetized compilation of all keywords that lists, next to each, the relevant master author citation numbers dealing with that particular keyword.

NEW CROP INFORMATION OBTAINED

The following observations seem relevant after working in the new crops area over the past 12 months and collecting the information presented. First, publication of information about the American agricultural sector is focused on issues related to well established crops and their end products. Publications are the result of research programs and research monies largely targeted for existing "traditional" crops.

Second, while agricultural products are this country's foremost export, and farm commodity subsidies have become the single fastest growing item in the federal budget, there is presently no systematic, coherent policy toward the development of alternative crops.[4] Two citations, discussed below, present a methodology for screening crops; however, no citations were found whose general objective was to present and compare or contrast various methods of identifying alternative crop possibilities. Perhaps alternative crop investigators have not relied on formalized procedures. As practiced in the past, alternative crop identification and development processes were discontinuous, qualitative, and time consuming—all characteristics that do not lend themselves to formalization.

Third, of all the citations found that do have relevance, only nine relate to the development and maintenance of a crop database. Literature related to agricultural databases may be scarce because of the relatively short time computer hardware and software have been available for individual scientific use.

Fourth, a disproportionate number of citations presented below relate to physical issues of screening or database design rather than socioeconomic issues. Traditionally, the economist was consulted quite late in the process, resulting in input limited to comparative advantage studies that examine ques-

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[4]Council for Agricultural Science and Technology (CAST), in this report, p. 21.

tions concerning cost of production and transportation.

Last, two reports, both written by Soil and Land Use Technology, Inc. (SaLUT), contain valuable information. Their first study was published in two volumes by the National Academy of Science in 1978 and is entitled "Feasibility of Introducing Food Crops Better Adapted to Environmental Stress." This report outlines a screening methodology limited to the continental United States for identifying promising alternative crops. By using existing information on physical crop requirements, the number of crops was screened from 1000 to 54. Panels of experts were then consulted to winnow the number down to a final 20 crops with the greatest potential.

The second follow-up report by SaLUT is "Feasibility of Introducing New Crops: Production-Marketing-Consumption (PMC) Systems." This report outlines the necessary conditions for new crop development and goes on to suggest a methodology for identifying bottlenecks in the development process and setting priorities for action. Six crops, new to the continental United States, are analyzed in detail. This report also includes a derived demand model, which has been incorporated into the Hawaii crop screening methodology.

Other particularly informative citations were by Austin (*3*), Duckham and Masefield (*15*), Hackett and Carolane (*22*), and Webb et al. (*60*). The number after each author indicates the number for that particular citation in the Master Author List found on the following pages.

Master Author List

1. Abell D F, Hammond J S, 1979, Strategic Market Planning--Problems and Analytical Approaches, Prentice-Hall, Inc., Englewood Cliffs, New Jersey. Strategic planning, Project analysis. Worldwide.
ABST:
Provides a good introduction to the common strategic planning techniques. Also evaluates and contrasts various techniques. Discussion is not specifically oriented to agriculture.

2. Andrews B, 1975, Creative Product Development, Longman Inc., New York. New product development, Marketing, Innovation. Worldwide.
ABST:
Presents a business oriented view of new product development that focuses on manufactured goods. Provides good coverage of topics relating to evaluation of market opportunities, sources of innovation, new product development systems, etc.

3. Austin J E, 1981, Agroindustrial Project Analysis, Johns Hopkins University Press, Baltimore, Maryland. Project analysis, Marketing, Processing. Developing world.
ABST:
Focuses on three often overlooked aspects of project evaluation--marketing, procurement, and processing. Includes a good checklist of important considerations.

4. Baker H L, 1972, Land Classification and Determination of Highest and Best Use of Hawaii's Agricultural Lands, Special Study Series, LSB Report No. 10, Land Study Bureau, University of Hawaii, Honolulu, Hawaii. Land aggregation techniques. Hawaii.
ABST:
Good explanation of how, once lands have been classified, the information can be used to identify the highest and best use for individual land types.

5. Berridge T, 1977, Product Innovation and Development, Business Books Limited, Highbury Crescent, London. New product development, Project analysis. USA and Western Europe.
ABST:
Business oriented new-product development text that has excellent sections on organizing and screening new product opportunities and then evaluating and selecting profitable projects. Also includes a section on uncertainty.

6. Bollard A, 1980, Grower Preference for Crops and Implications for Plant Breeders, American Journal of Agricultural Economics, Vol. 62, No. 3, pp. 530-533. Methodology. Papua-New Guinea.
ABST:
This note explains how to develop nonstationary production functions that specify profitability, variability, and the rate of growth as a series of estimable parameters. The function is used to explain new crop choice in the Cook Islands.

7. Brown M L, 1979, Farm Budgets, Johns Hopkins University Press, Baltimore, Maryland. Project analysis, Farm management. Developing world.

ABST:

The ". . .focus is on farm income analysis which is a necessary complement to agricultural analysis, because it is important to consider the profitability of the project not only in the aggregate over the life of the investment but also on a year-by-year basis."

8. Clifton D S, Fyffe D E, 1977, Project Feasibility Analysis, John Wiley & Sons, Inc., New York. Market analysis, Processing, Project analysis. Worldwide.

ABST:

Excellent presentation on the use of semantic differentials in the pre-feasibility study section (p. 24).

9. Congworth J W, Menz K M, 1980, Activity Analysis: Bridging the Gap between Production Economics Theory and Practical Farm Management Procedures, Review of Marketing and Agricultural Economics, Vol. 48, No. 2. Methodology. Worldwide.

ABST:

Activity analysis is presented as a method that links the neoclassical theory of production and farm management procedures. "The concept of an activity can be seen as being central not only to farm management procedures and production theory, but also to linear programming and other mathematical programming techniques."

10. Council for Agricultural Science and Technology (CAST), 1984, Development of New Crops: Needs, Procedures, Strategies, and Options, Council for Agricultural Science and Technology, Report No. 102, Ames, Iowa. Innovation, Research resource allocation. USA.

ABST:

This report gives a current assessment of the "new crops" development efforts in the United States. It provides an interesting history of programs, both public and private. A strong case is made for the early integration of economic information to help in identifying new crop alternatives. A number of factors were identified as requisites to new crops programs. Policy alternatives to foster new crops programs were also discussed. Much of the economic material may be found in more detail in the SaLUT studies also included in this bibliography.

11. Cull I M, 1983, Midwest Plants for Potential Crops, Transactions of the Illinois State Academy of Science, Vol. 76, No. 1 & 2, pp. 203-212. De-select criteria, Methodology. Midwestern United States.

ABST:

Explains how the Northern Regional Research Center conducts their botanical and chemical evaluations of crops and what factors they consider when looking at new crop potential.

12. Dallwitz M J, 1980, A General System for Coding Taxonomic Descriptions, Taxon, Vol. 21, No. 1, pp. 41-46. Physical attributes--crops, Crops database. Worldwide.

ABST:

A system for description of plant characteristics is presented. A computer program is used that will generate natural language descriptions from coded punchcards.

13. Dalton G E, 1982, Managing Agricultural Systems, Applied Science Publishers, New York. Methodology. Worldwide.

ABST:

Looks at agricultural production and marketing from a systems standpoint. Provides good, although basic, information on system formulation. Methodologically, some interesting ideas are presented although there is an assumption of much more information being available than is likely in many situations.

14. Doorenbos J, Kassam A H, 1979, Yield Response to Water, FAO Irrigation and Drainage Paper 33, Food and Agriculture Organization of the United Nations, Rome. Farm management. Worldwide.

ABST:

Provides a detailed discussion of how agronomic and climatic variables impact yields. Focus is on irrigation of common crops.

15. Duckham A N, Masefield G B, 1970, Farming Systems of the World, Praeger Publishers, New York. Methodology, De-select criteria. Worldwide.

ABST:

Provides an excellent overview of factors that impinge on a farm production system and develops a system for ranking those factors. Includes a general description of the major types of farming systems throughout the world.

16. Duke J A, 1978, The Quest for Tolerant Germplasm, In Jung G A (ed.), Crop Tolerance to Suboptimal Land Conditions, ASA Special Publication No. 32, American Society of Agronomy, Madison, Wisconsin. Physical attributes--crops, New crops--general. Worldwide.

ABST:

Introduces and explains the features of a computerized crop climate database covering over 1000 crops. At this point there is some question as to the adequacy of this database as a physical screening tool due to the limited number of physical parameters included and the wide intervals accorded to individual observations.

17. Food and Agriculture Organization of the United Nations, 1981, Report on the Agro-Ecological Zones Project, Vol. 3--Methodology and Results for South and Central America, Food and Agriculture Organization of the United Nations, Rome. Physical attributes--crops, Land aggregation techniques, Methodology. Worldwide.

ABST:

Provides an excellent summary of methodology used to assess the potential agricultural use of the world's land resources. Explains how the FAO integrated the climatic adaptability of plants, soil requirements, climate, soil characteristics, and biomass yield of crops into suitability classifications for assessing major crops of the world. Methodology is thought applicable to other crops as well.

18. Gillenson M L, Goldberg R, 1984, Strategic Planning, Systems Planning, Systems Analysis, and Database Design, John Wiley and Sons, New York. Strategic planning, Crops database. Worldwide.

ABST:

The author suggests using a continuous flow approach to dealing with the corporate problem of obtaining the right information on which to base strategic planning decisions. Although general in nature, the systems analysis section provides a number of possible techniques that might be used to identify important factors in crop evaluation.

19. Hackett C, 1983, A Draft Set of Core Modules and Three Supplemental Modules for a Tabular Method of Describing the Qualities of Plant Species, Technical Memorandum 83/26, CSIRO, Institute of Biological Resources, Division of Water and Land Resources, Canberra A.C.T. Physical attributes—crops, Crops database. Worldwide.

ABST:

Presents eleven core modules and three supplemental modules that can be used in describing physical attributes of crops. Gives a set of descriptions in each module that can be used, adjusted, or discarded if not thought relevant. The author provides these modules as first approximations in the hope that communal agreement may be reached in the future.

20. Hackett C, 1983, Role and Content of Species-level Crop Descriptions, Economic Botany, Vol. 37, No. 3. New crops--general, Physical attributes--crops, Crops database. Worldwide.

ABST:

The author presents the concepts of crop modules as a method of dealing with the lack of standardization presently found in moderately detailed crop descriptions.

21. Hackett C, 1983, Plant Description on Modules: An Aid to the Compilation, Storage and Retrieval of Tabular Descriptions, Divisional Report 83/2, CSIRO, Institute of Biological Resources, Division of Water and Land Resources, Canberra A.C.T. Physical attributes--crops, Crops database. Worldwide.

ABST:

Four general types or classes of species level descriptions are identified. The advantages and disadvantages of various types are discussed. Class C comprises either textual or tabular profiles encompassing from 20 to 200 attributes. Five recent tabular systems, both manual and computerized in nature, are described. Computerization favors the tabular form of descriptions but problems are inherent. A modular system of data gathering is presented as a means of ameliorating these problems.

22. Hackett C, Carolane J, 1982, Edible Horticultural Crops: A Compendium of Information on Fruit, Vegetable, Spice and Nut Species, Academic Press, Inc., New York, Volumes I-IV. De-select criteria, Agron/Hort adaptability, Culture practices, Crops database. Worldwide.

ABST:

Is the only known database centered on physical attributes which matches given "farm size" plots with potential crops.

23. Hax A C, Majkuf N S, 1983, The Use of the Industry Attractiveness-Business Strength Matrix in Strategic Planning, Interfaces, Vol. 13, No. 2, pp. 54-71. New product development, Strategic planning, Methodology. Developed world.

ABST:

The Industry Attractiveness-Business Strength Matrix is presented and the steps necessary to implement the matrix are outlined. It is said to complement NPV as an investment analysis tool. This concept might be used in a ranking, evaluation framework.

24. Hedges T R, Sitton G R, 1956, Farm Management Manual. . . A Guide to Reorganizing a Farm, The National Press, Palo Alto, California. Farm management. Worldwide.

ABST:

Incorporates "Unit Test" and "Normal" concepts to identify the relative profitability of previously identified crops. Helpful concepts to employ in later stages of research where profitability will be an issue.

25. Hill L D, 1965, Agricultural Market Planning in Resource Development, Special Publication No. 9, University of Illinois, College of Agriculture, Cooperative Extension Service, Urbana, Illinois. Research resource allocation, Methodology. USA.

ABST:

A good extension publication that looks at market potential, comparative advantage, and physical criteria of locale to identify possible crops and then details how to analyze the marketing system.

26. ILACO, 1981, Compendium for Agricultural Development in the Tropics and Subtropics, Elsevier North-Holland, Inc., New York. Culture practices, Land classification. Humid tropics, Subtropics, Dry tropics.

ABST:

Presents detailed information concerning climate, soil and land classification, water control, land improvement, foods and fiber, industrial crops, animal production, farm economics, and sociology, all within the context of the tropics.

27. Industrial Research Advisory Council, 1953, Abstracts: Agricultural, Industrial and Economic Research, Industrial Research Advisory Council, Honolulu. New crops—general. Hawaii.

ABST:

Presents a survey of all reported, verifiable agricultural, industrial, and economic research conducted within the Hawaiian Islands between 1930 and 1952. The focus is on agricultural research with approximately 5200 studies identified. Provides information identifying early work on alternative crops. No reference to a systematic research process was found.

28. Joint Task Force on Other Oilseeds, Miscellaneous, and New Crops, 1969, A National Program of Research for New Crops and Minor Oilseeds, A Joint Task Force of the U.S. Department of Agriculture and the State Universities and Land Grant Colleges. New crops—general, Research resource allocation. USA.

ABST:

A Task Force on New and Special Crops identified 36 new crops as promising. They were grouped by category and suggested research programs in the protection, production, utilization, and marketing areas were outlined. No actual explanation of how the 36 crops were selected is included.

29. King G A, Logan S H, 1964, Optimum Location, Number, and Size of Processing Plants with Raw Product and Final Product Shipments, Journal of Farm Economics, Vol. 45, No. 1, pp. 94-109. Methodology. USA.

ABST:

Utilizes the transshipment model to simultaneously consider the costs of shipping raw materials, processing, and shipping of the final product. This approach may prove helpful in identifying the scope of the inquiry and may be valuable as an analysis tool in later stages of the research project.

30. Knowles P F, 1960, New Crop Establishment, Economic Botany, Vol. 14, pp. 263-275. New crops—general. USA.

ABST:

This excellent paper identifies 14 factors thought important in affecting the establishment of a crop. This is the earliest paper on new crop development that includes a discussion of "individual perseverance" or "crop champions."

31. Land Study Bureau, 1967, Detailed Land Classification--Island of Kauai, Land Study Bureau Bulletin No. 9, Land Study Bureau, University of Hawaii, Honolulu, Hawaii. Land aggregation techniques. Hawaii.
ABST:
Provides a detailed explanation of how land has been classified. Includes criteria employed, methods for aggregation of lands into similar types, and then the development of productivity ratings.

32. Lang D M, Armitage M S, 1983, Land Suitability for Major Crops in Dominica, Dominica Land Use Planning Project, Project Report 127, Land Resources Development Centre, Tolworth Tower, Surbiton, Surrey, England. Land aggregation techniques, Methodology, Crops database. Dominica.
ABST:
Provides an explanation of how land for the island of Dominica was aggregated into various yield categories for each of twenty common tropical crops. Attached graphic output shows the areas where the crops should grow. (Includes a three-part series and the relevant maps.) No economic analysis was attempted.

33. Lewis R D, 1957, Task Group Explores Potentials for Developing New Farm Crops, Chemurgic Digest, Vol. 16, No. 2, pp 7-12. New crops--general, Industrial usage, Research resource allocation. USA.
ABST:
This journal article by the chairman of a National Commission on New and Special Crops identifies a number of specific industries in which there were thought to be new crop possibilities and/or needs. He then goes on to describe some of the research needs thought relevant at the time. This discussion is very similar to that found in a recently published CAST report (October 1984), also included in this bibliography.

34. Merrill H M, Schwappe F C, 1984, Strategic Planning for Electric Utilities : Problems and Analytic Methods, Interfaces, Vol. 14, No. 1, pp. 72-83. Strategic planning, Methodology. USA.
ABST:
Presents a very good explanation of how multiobjective decision making under uncertainty is handled in the electric utility industry. Perhaps this technique could be adopted for new crop analysis in cases where information is easily available.

35. Moneypenny J R, Walker N, 1976, APMAA'74: A Minimum-level Aggregative Programming Model of New South Wales Agriculture, Review of Marketing and Agricultural Economics, Vol. 44, Nos. 1-2, pp. 3-17. Farm management, Sectoral modeling. Australia.
ABST:
Demonstrates the use of a statewide agricultural model employing representative farms to determine the impact of policy adjustments. Model could be of value at a later stage of the project.

36. Mustakas G C, Carlson K D, 1979, Simple Model for Determining Economic Feasibility of Processing New Oilseeds, Journal of American Oil Chemists' Society, Vol. 56, No. 1, pp. 29-32. Marketing, Processing, Methodology, Market analysis, Industrial usage. USA.
ABST:
The authors present a simple, but valuable, cost-of-processing model that can be used in determining the feasibility of a new oilseed crop. The estimated break-even cost of a new oil is compared with the cost of a competitive oil. A programmable hand calculator may be used to make the straightforward calculations.

37. Pinstrup-Andersen P, 1982, Agricultural Research and Technology in Economic Development, Longman, New York. Research resource allocation. Worldwide.
ABST:
Presents a general treatise on the role of agricultural research in development. Has a good chapter on methods to enhance research contributions in LDCs. Does not speak directly about evaluation of alternatives, but excellently illustrates the interface between food (agricultural) policy and research.

38. Pinstrup-Andersen P, Franklin D, 1977, A Systems Approach to Agricultural Research Resource Allocation in Developing Countries, In Anndt T M, Berrymple D G, Rutton V W (eds.), Resource Allocation and Productivity in National and International Agricultural Research , University of Minnesota Press, Minneapolis, pp. 416-435. Research resource allocation. Developing world.
ABST:
A well developed outline exploring two models that could help researchers determine the mix of crops for which research should be continued.

39. Plain B, Ole B T, Bond G E, Spinks M L, 1981, Oilseed and Grain-legume Crops: An Analysis of Their Economic Potential in Southern New South Wales, Bureau of Agricultural Economics, Canberra. Methodology. Australia.
ABST:
Provides exact methodology for evaluating a few selected alternative crops using a linear-programming approach that incorporates risk. Actual focus in selecting alternative crop enterprises is on decreasing the variability of expected total farm income below that obtained from traditional enterprises alone. Could provide a good approach to specific crop analysis in later project phases.

40. Princen L H, 1979, New Crop Developments for Industrial Oils, The Journal of the American Oil Chemists' Society, Vol. 56, No. 9, pp. 845-848. New crops--general. USA.
ABST:
A group of new crops and prospective new crops is available to be utilized for the production of renewable industrial resources. A number of physical bottlenecks are identified. The author outlines the necessity of working with the marketing, processing, and production groups simultaneously if new crop development is to be achieved.

41. Princen L H, 1982, Alternative Industrial Feedstocks from Agriculture, Economic Botany, Vol. 36, No. 3, pp. 302-312. New product development. USA.

ABST:

Tradition appears to be a major obstacle to increasing the use of alternative feedstocks from agriculture. An over-reliance on petrochemical derivatives has resulted in a knowledge void with respect to botanical feedstocks. The complex number of subsystems involved make new crop development extremely difficult.

42. Princen L H, 1983, New Oilseed Crops on the Horizon, Economic Botany, Vol. 37, No. 4, pp. 487-492. Methodology, New product development. USA.

ABST:

The author identifies two major barriers in new crop programs. First, it is difficult to find interested scientists and the related funds to coordinate breeding and agronomy programs for desirable new crops. Secondly, the risks of new product development are too great for private industry to bear alone. Programs must be developed whereby the public and private institutions share the risk in new product development.

43. Princen L H, Rothfus J A, 1984, Development of New Crops for Industrial Raw Materials, Journal of the American Oil Chemists' Society, Vol. 61 , No. 2, pp. 281-289. Methodology, Industrial usage. USA.

ABST:

Some major new crop possibilities are presented, and the problems incurred in moving from the research arena to complete commercialization are explored. A major point is made that private industry is not likely to carry out this type of research alone. Government agencies will have to begin providing some form of limited assistance, if commercialization is to occur.

44. Pryde E H, 1983, Utilization of Commercial Oilseed Crops, Economic Botany, Vol. 37, No. 4, pp. 459-477. Agron/Hort adaptability. USA.

ABST:

Soybean is by far the major oilseed crop in the United States. Other oilseed crops must rely on a large number of by-products if they are to be viewed as significant contributors to the nation's feed, food, industrial products, and agricultural fuel needs. Greatly improved productivity will be needed either from new oilseed crops or from improved varieties of present commercial crops.

45. Ripperton J C, Hosaka E Y, 1942, Vegetation Zones of Hawaii, Hawaii Agricultural Experiment Station Bulletin No. 89, University of Hawaii, Honolulu. Land classification. Hawaii.

ABST:

Early work on Hawaiian land classification. The work is one of the best and is still frequently cited in present work. Publication includes color maps and identifies 10 vegetation zones.

46. Rothschild W E, 1979, Strategic Alternatives, AMACON, New York. Strategic planning. USA.

ABST:

This book is a basic introduction to strategic planning. It does not provide detail, but does lay the conceptual groundwork for many of the other books and articles on various topics in the strategic planning area.

47. Seigler D S (ed.), 1977, Crop Resources, Proceedings of the 17th Annual Meeting of the Society of Economic Botany, "Crop Resources," University of Illinois, Urbana, Ill. New crops—general, Industrial usage. USA and Canada.

ABST:

The first article in the book is by L. H. Princen, Chief of the United States Department of Agriculture's Northern Regional Center at Peoria, Illinois. He describes the role and activities of the center in the search for "new" crops. The work focuses on the industrial characteristics of plants and their by-products. Other papers include detailed discussions of particular crops (primarily horticultural or agronomic in nature) and a few excellent histories on the development of wheat, soybeans, etc.--the traditional crops of today.

48. Simon J E, Chadwick A F, Craker L E, 1984, Herbs: An Indexed Bibliography 1971-1980, Archon Books, Hamden, Connecticut. Culture practice, Physical attributes—crops. Temperate zone.

ABST:

This bibliography provides a wealth of recent information concerning 64 of the more common herbs used throughout the world. The bibliography has entries for the herbs divided into ten subject classes. They are chemistry, botany, bionomics, horticulture, production ecology, culinary studies, pharmacology, perfumery, natural dyes & ornamental applications, and commerce. Short summaries are provided together with the lists of relevant citations.

49. Slijper M J, 1972, Assessing Export Potential, Grower Press, Ltd., London. Trade. Western Europe.

ABST:

Case studies illustrate various aspects of marketing strategies, promotional requirements, distribution analysis, pricing, organizational adjustment, etc.

50. Soil and Land Use Technology, Inc., 1978, Feasibility of Introducing Food Crops Better Adapted to Environmental Stress, Vol. 1, Applied Science and Research Applications, Report No. NSF/RA-780037, National Science Foundation, Washington, D.C. De-select criteria, Methodology. Continental USA.

ABST:

Excellent presentation that integrates botanical, economic, institutional, and macro/micro considerations into a de-selection/ selection crop evaluation process. To date, this is the only project found that is similar to ours.

51. Soil and Land Use Technology, Inc., 1978, Feasibility of Introducing Food Crops Better Adapted to Environmental Stress, Vol. 2, Individual Reports, Applied Science and Research Applications, Report No. NSF/RA-780038, National Science Foundation, Washington, D.C. Marketing, Agron/Hort adaptability. Continental USA.
ABST:
Fifty-four crop reports are presented that summarize relevant physical and economic aspects of possible temperate zone crops.

52. Soil and Land Use Technology, Inc., 1981, Feasibility of Introducing New Crops: Production-Marketing-Consumption (PMC) Systems, Directorate for Biological Behavioral Science (BBS), Report No. NSF/PMC-81004, National Science Foundation, Washington, D.C. De-select criteria, Methodology, Industrial usage. Continental USA.
ABST:
Develops a PMC matrix that might be helpful in later project stages. Focus is on 40 criteria in the production, marketing, and consumer areas. Excellent systems approach to new crop development.

53. Srivastava U K, 1981, Project Planning, Financing, Implementation and Evaluation, Indian Institute of Management, Ahmedababad, India. Project analysis. Worldwide with examples from India.
ABST:
Probably will be a good reference for later in the project; however, little relates directly to crop de-selection or selection.

54. State of Hawaii Dept. of Planning and Economic Development, 1969, The Life of the Land--Agriculture in Hawaii: Its Background, Problems and Potential, Proc. Planning Conference on a Statewide Agricultural Development Plan, Hilo, Hawaii, May 7-9, pp. 1-105. New crops--general. Hawaii.
ABST,
A "new crops" committee presented a report outlining the crops that they thought were important. Focus must be placed on identifying markets, dealing with legal structures, and quality. The report does not include any detail about how important new crops were identified.

55. USDA Critical Materials Task Force, 1984, Growing Industrial Materials: Renewable Resources from Agriculture and Forestry, United States Department of Agriculture, Office of Critical Materials, Washington, D.C. Industrial usage, Trade. USA.
ABST:
This 30-page report outlines the legislative background mandating a new emphasis on renewable industrial and strategic or critical products and crops. It then goes on to suggest industries in which agricultural products might play a new, vital role and discusses "research, technology, cooperation, and coordination" as the keys to developing industrial crops.

56. United Nations Development Organization, 1978, Manual for the Preparation of Industrial Feasibility Studies, ID/206, U.N., Vienna. Project analysis, Methodology. Worldwide.
ABST:
Annex I contains "Outlines of General Opportunity Studies." Three types are identified: outlines for general area studies; outlines of a subsector opportunity study; and outlines of a resource-based opportunity study. Opportunity studies are very general in nature and many examples have been published. The focus, however, is on identifying underutilized resources rather than a screening process.

57. Walker N, Moneypenny J R, 1976, Linear Programming as a Tool for Agricultural Sector-Analysis, Review of Marketing and Agricultural Economics, Vol. 44, No. 4. Sectoral modeling. Worldwide.
ABST:
Paper discusses typical problems encountered in construction of large-scale programming models, presents an overview of the goals of such models and the uses to which they have been applied.

58. Walker W B, 1979, Industrial Innovation and International Trading Performance, Contemporary Studies in Economics and Financial Analysis, JAI Press, Greenwich, Connecticut. Trade, Innovation. Worldwide.
ABST:
Reviews international trade theory; critiques the product life-cycle theory and assesses the impact of product and process innovation on trading performance.

59. Watson L, Dallwitz M J, 1981, An Automated Data Bank for Grass Genera, Taxon, Vol. 30, No. 2, pp. 424-429. Physical attributes--crops, Crops database. Worldwide.
ABST:
An automated taxonomic database for grass is described. At date of publication, 324 records were on hand. The information is coded in a DELTA format, allowing standard English output.

60. Webb D B, Wood P J, Smith J, 1980, A Guide to Species Selection for Tropical and Sub-tropical Plantations, Tropical Forest Papers No. 15, Commonwealth Forestry Institute, University of Oxford. Physical attributes--crops, Methodology, Crops database. Worldwide.
ABST:
This study is a well conceived, comprehensive example of the power inherent in computerized databases for obtaining species level information. Both economic and physical information for over 120 timber crops is included. (Focus is on tropical and subtropical species.)

61. Wind Y, Mahajan V, Cardozo R, 1981, New-Product Forecasting, D.C. Heath and Company, Lexington, Massachusetts. New product development. Developed world.

ABST:

Presents a series of papers related to new-product forecasting models. Major sections include classification and evaluation of new product models, concept-taste-based, pre-test-market based, test-market-based, and early-sales-based approaches to new product innovation and development.

62. Wolff I A, Jones Q, 1958, Cooperative New Crops Research--What the Program Has to Involve, Chemurgic Digest, Vol. 17, pp. 4-8. New crops--general. USA.

ABST:

Paper is an early statement of USDA thought concerning new crops alternatives. Includes general information with stated objectives for fiber, new protein, oilseed, and pharmaceutical crops.

63. Zandstra H G, Price E C, Litsinger J A, et al., 1981, A Methodology for On-farm Cropping Systems Research, The International Rice Research Institute, Manila. Methodology, Cropping systems, Land classification. Worldwide.

ABST:

A good presentation of cropping systems methodology. May be beneficial in later stages of the project.

Complete Author Index

Complete Keyword Index

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Hawaii Agricultural Experiment Station, Hawaii Institute of Tropical Agriculture and Human Resources
College of Tropical Agriculture and Human Resources, University of Hawaii at Manoa
Noel P. Kefford, Director and Dean

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